

CLAIMS

What is claimed is.

- 1 1. A process comprising:
2 mating a microelectronic die substrate to a board, wherein the substrate
3 includes an upper surface, a lower surface, and a solder first bump disposed on the
4 lower surface; and while mating
5 forming a stress-compensation collar (SCC) on the board, wherein the SCC
6 abuts the solder first bump.
- 1 2. The process of claim 1, wherein forming the SCC includes embedding the
2 solder first bump into the SCC to a depth range from about 5 percent embedded to
3 about 95 percent embedded.
- 1 3. The process of claim 1, further including reflowing the solder first bump.
- 1 4. The process of claim 1, further including:
2 reflowing the solder first bump; and
3 curing the SCC.
- 1 5. The process of claim 1, wherein forming an SCC includes dispensing an
2 SCC mass on the board.
- 1 6. The process of claim 1, wherein forming an SCC includes dispensing an
2 SCC mass on the board, wherein the SCC mass includes a plurality of spaced-apart
3 spots.
- 1 7. The process of claim 1, wherein mating includes mating through an uncured
2 organic composition that includes a non-fugitive element in the composition, and

3 wherein the composition includes at least one material selected from an epoxy
4 solder paste, an epoxy flux, and combinations thereof.

1 8. The process of claim 1, wherein mating includes mating through an uncured
2 organic composition that includes a non-fugitive element in the composition, and
3 wherein the composition includes at least one material selected from a resin-
4 containing flux, a cyanate ester-containing flux, a polyimide-containing flux, a
5 polybenzoxazole-containing flux, a polybenzimidazole-containing flux, a
6 polybenzothiazole-containing flux, a polymer-solder-flux paste, and combinations
7 thereof.

1 9. The process of claim 1, wherein mating includes mating through an uncured
2 organic composition that includes a non-fugitive element in the composition, and
3 wherein the composition includes at least one material selected from a paste, a
4 solder paste, an epoxy-containing solder paste, a resin-containing paste, a cyanate
5 ester-containing paste, a polyimide-containing paste, a polybenzoxazole-containing
6 paste, a polybenzimidazole-containing paste, a polybenzothiazole-containing paste,
7 a flux, and combinations thereof.

1 10. The process of claim 1, wherein forming an SCC includes dispensing a
2 single SCC mass on the board.

1 11. The process of claim 1, before mating, the process including:
2 forming a stress-relief layer (SRL) upon the substrate lower surface, wherein
3 the SRL partially embeds the solder first bump.

1 12. The process of claim 1, further including:
2 forming an SRL upon the substrate lower surface, wherein the SRL partially
3 embeds the solder first bump; and
4 reflowing the solder first bump.

1 13. The process of claim 1, further including:
2 forming an SRL upon the substrate lower surface, wherein the SRL partially
3 embeds the solder first bump;
4 reflowing the solder first bump; and
5 curing at least one of the SCC and the SRL.

1 14. The process of claim 1, further including:
2 forming an SRL upon the substrate lower surface, wherein the SRL partially
3 embeds the solder first bump, and wherein forming includes dispensing the SRL by
4 ejecting a discrete series of quanta of polymer masses upon the lower surface that
5 includes a ball grid array in excess of four solder bumps including the solder first
6 bump.

1 15. An article comprising:
2 a mounting substrate including a lower surface and an upper surface;
3 a solder first bump disposed on the lower surface;
4 and a stress-compensation collar (SCC) disposed on a board, wherein the
5 SCC partially embeds the solder first bump.

1 16. The article of claim 15, further including a stress-relief layer (SRL) disposed
2 on the lower surface, wherein the solder first bump is at least partially embedded in
3 the SRL.

1 17. The article of claim 15, further including a die disposed upon the upper
2 surface that is coupled to the solder first bump.

1 18. The article of claim 15, further including:
2 a stress-relief layer (SRL) disposed on the lower surface, wherein the solder
3 first bump is at least partially embedded in the SRL; and

4 a die disposed upon the upper surface that is coupled to the solder first
5 bump.

1 19. The article of claim 15, wherein the SCC includes an organic material.

1 20. The article of claim 15, wherein the SCC includes a composition that
2 includes a non-fugitive element in the composition, and wherein the composition
3 includes at least one material selected from an epoxy solder paste, an epoxy flux,
4 and combinations thereof.

1 21. The article of claim 15, wherein the SCC includes a composition that
2 includes a non-fugitive element in the composition, and wherein the composition
3 includes at least one material selected from a resin-containing flux, a cyanate ester-
4 containing flux, a polyimide-containing flux, a polybenzoxazole-containing flux, a
5 polybenzimidazole-containing flux, a polybenzothiazole-containing flux, a polymer-
6 solder-flux paste, and combinations thereof.

1 22. The article of claim 15, wherein the SCC includes a composition that
2 includes a non-fugitive element in the composition, and wherein the composition
3 includes at least one material selected from a paste, a solder paste, an epoxy-
4 containing solder paste, a resin-containing paste, a cyanate ester-containing paste, a
5 polyimide-containing paste, a polybenzoxazole-containing paste, a
6 polybenzimidazole-containing paste, a polybenzothiazole-containing paste, a flux,
7 and combinations thereof.

1 23. The article of claim 15, wherein the SCC includes a substantially continuous
2 sheet that embeds a plurality of solder bumps including the solder first bump.

1 24. The article of claim 15, wherein the solder first bump is in a rectangular
2 pattern with a solder second bump, a solder third bump, and a solder fourth bump,

3 and wherein the SCC includes a first SCC that abuts the solder first bump, a second
4 SCC that abuts the solder second bump, a third SCC that abuts the solder third
5 bump, and a fourth SCC that abuts the solder fourth bump.

1 25. The article of claim 15, wherein the SRL includes a particulate filler.

1 26. A computing system comprising:
2 a board including a bottom and a land side;
3 a substrate including a lower surface and an upper surface, wherein the
4 board is disposed on the substrate land side;
5 a solder first bump disposed on the lower surface;
6 a stress-compensation collar (SCC) disposed on the board, wherein the
7 solder first bump is at least partially embedded in the SCC;
8 a die disposed upon the upper surface, wherein the die is coupled to the
9 solder first bump;
10 at least one of an input device and an output device coupled to the solder
11 first bump; and
12 a housing enclosing the SCC.

1 27. The computing system of claim 26, further including a stress-relief layer
2 (SRL) disposed on the lower surface, wherein the solder first bump is at least
3 partially embedded in the SRL, and wherein at least a portion of the solder first
4 bump is exposed above the SRL.

1 28. The computing system of claim 26, wherein the computing system is
2 disposed in one of a computer, a wireless communicator, a hand-held device, an
3 automobile, a locomotive, an aircraft, a watercraft, and a spacecraft.

1 29. The computing system of claim 26, wherein the die is selected from a data
2 storage device, a digital signal processor, a micro controller, an application specific
3 integrated circuit, and a microprocessor.